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ABSTRACT

The purpose of the present study was to determine faculty output and accountability within faculty workload by determining the unit cost in output and effort in graduating a single Ph.D. student. Work equivalents are determined from institutional and faculty self-reports at a major graduate university in which 225 faculty members were surveyed. Findings show that a faculty output of 1 Ph.D. per year is approximately one-third of a workload. It is evident that graduating a Ph.D. requires more effort than teaching 1 regular 3-hour course during a term. Since there is a price value on the credit hour, there can be derived a cost equivalency for Ph.D. output. (HS)

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ABSTRACT

General concerns for faculty accountability are examined in the context of faculty workload and costs. Graduating a Ph.D. student is used as the unit for analysis. The unit is compared to instructional productivity. The data employed comes from a ten-year interval at a major graduate university. Six liberal arts departments with a 225 member faculty provide the Ph.D. output and workload information.

Work equivalents are determined from institutional and faculty self-reports. Implications are given for comparisons between programs within a university and between types of institutions in the larger system of higher education. Concerns also emerge for improved personnel practices vis a vis faculty.

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Two matters press on higher education today with increasing intensity. They are faculty accountability and the need for criteria for allocating limited resources among competing and differing programs and institutions. Less the gravity of the concerns distort the lens and throw the objective out of focus, close scrutiny of these interrelated issues is urgent. Succinctly, the questions being asked are: What does a program cost? Are faculty doing their jobs? Is faculty output commensurate with the dollars being expended?¹

¹ "Producer," "output," and the like are crude items, especially when human beings are the subject. Using the argot of job analysis -- as this research requires -- makes us sound compassionless. We sincerely believe the opposite to be the case. In fact, it was the deeply personal nature of the sponsor-candidate relationship which motivated this inquiry.

This preliminary analysis concentrates on faculty and institutional production of Ph.D. students. Narrowing the field produces a sharper picture and magnifies the extremes of high and low cost. At the same time, it illuminates the problems of private as well as public higher

education, of undergraduate as well as graduate programs. At the end, a wide angle lens is inserted and thereby any myopia induced by self-imposed restrictions can be corrected.

BACKGROUND

Cost

To begin with, a long standing rule-of-thumb cost formula now receives empirical corroboration. The first two years of college, the last two plus the first year of graduate work (including the masters degree), and doctoral level graduate work are in a cost ratio of 1:2:4 (Hansen and Sandler, 1967; Carnegie, 1970). Said another way, doctoral education cost twice upper division and beginning graduate; it is four times as expensive as the first two years of college.

Before examining the consequences of these expense ratios in more detail, it is essential to keep firmly in view that no value judgement is being made on any level of education due to cost differential. Goodness or badness, better or worse are not involved. Despite the country's momentary imbalance of trained people and unemployment, society is always going to need a wide range of highly educated persons and complex equipment. It is not that a doctor is more important than a medical technologist, or that an electron microscope is more important than a pair of glasses. What is involved is the simple fact that it costs more to produce some kinds of people and things than it does others.²

² Incidentally, future income is not always in proportion to the expense of the education involved. It is true that the physician's education is extraordinarily expensive and that his income is the highest of all professional people. But a lawyer, whose earnings rank second, requires an education that costs much less, as does that of an M.B.A. or engineer. On the other hand, a minister with a D.Th. or a professor with a Ph.D. spends even greater sums and defer incomes for longer a period of time than does any of those mentioned above. In addition, their income is far below that of the professionals previously mentioned, as well as below the income of chiropractors, airplane pilots, athletes, half of the 48 groups in the U.S. Census Bureau (1964) comparative studies of professionals' incomes.

Hence it follows that those institutions that society has designated to produce the more costly trained personnel require funds in proportion to the ratios indicated previously. Legislators who deal with the full spectrum of higher education -- community colleges, four-year colleges, emerging universities with some graduate programs, and mature universities with a wide mix of doctoral programs -- know costs are far from equal across types. Similarly, Boards of private colleges and universities, who are considering adding or deleting programs, recognize the differential costs and savings of programs requiring different degrees of training.

The matter of how costs relate to faculty productivity, then, depends upon faculty workload, the time required for various kinds of outputs.

Workload

The literature on faculty work effort both rewards and frustrates the needed analysis. Too often the latter is the case.

A survey of sixty articles, books, pamphlets, and conference reports dealing directly with faculty workload, and seventy-four studies related indirectly to faculty workload (role, identity, ethics, teaching, and general faculty characteristics) have been reviewed. The search, covering a span of publications in a sixty year period, yielded considerable subjective opinion on the diversity and demanding nature of faculty workload; however, statistical information was lacking. Few academicians have approached the topic through carefully planned analyses of the faculty workload.

In a study of faculty workload fifty years ago, Koos made the statement:

Tradition, sentiment, rule of thumb and temporizing compromise, these have been and unfortunately still are the dominant method used in educational administration (Koos, 1919).

Ten years later Reeves and Russell, in a study of instructional loads, stated:

The evaluation of faculty load is an extremely difficult problem. Teaching duties and other professional duties vary tremendously from institution to institution and from individual to individual within a given institution. In fact, the factors involved in determining total faculty load are so numerous and so varied as almost to preclude precise determination by any mechanical method. No

thoroughly scientific method of measuring faculty load is now available. Existing measures are unsatisfactory and incomplete. The answers are not yet in. Yet, as a practical necessity, some method of measuring and adjusting faculty load--even though only approximate--must be employed (Reeves and Russell, 1929).

Seventeen years later Russell again summarized the state of this art:

Discouragingly little progress has been made in recent years in improving the technique of evaluating faculty service loads. Research is needed to point the way to better procedures of a sort that will be practical in internal administration of colleges and universities (Russell, 1946).

The need for defining faculty workload in a meaningful way has long been given lip service by educators. A conference of the American Council on Education in 1960, dealing specifically with faculty workload, concluded:

The need for a generally accepted definition of faculty workload has long been recognized by such national agencies as the American Association of Collegiate Registrars and Admissions Officers, the American Council on Education, and the U.S. Office of Education... Unless an educational group takes the initiative in working out definitions, other noneducational agencies will do so. (Bunnell, 1960: 63).

The possibility of state agencies taking the initiative in defining faculty workload may be a real threat to public graduate schools. The danger of faculty workload data being interpreted without proper consideration of individual institutional objectives has been trumpeted (Doi, 1961).

Despite the need for faculty workload studies, discouragingly little progress has been made. Bunnell (1960), Stecklein (1961), and Richardson (1967), who have conducted relatively comprehensive work in this area, do not give even passing comment to the faculty effort involved in dissertation advising.

No doubt reasons for non-activity reside partly outside offices of institutional research. Faculty resist time studies of their professional role. Their reasons are many. Threats to their autonomy exist. Also, Taylor's analyses were anything but humane. Besides, there is strong personal factor that can never be ignored. As a master Dean remarked sometime ago:

There is something inherently shocking to any [professor] in the idea that his [work], which is the outcome of his whole training, his whole philosophy of life, the accidents of his departmental and school environment, of his assigned task in a college system, of his selection of pupils, his state of health, his personal relations with colleagues and administration -- that the unique produce of all these factors should be represented by a place on a scale or by a number (Guthrie, 1949; 109).

On the positive side, a group of studies report the total number of hours faculty work in a typical week. McElhaney (1959), Gerstl (1959), Stecklein (1961), WICHE (1961), French, Tupper, and Mueller (1965), Clark (1968), University of Minnesota (1970),

University of Michigan (1970), and Keene (1971), each find that faculty work between 53 and 60 hours per week, with a high preponderance at 55-57 hours. The small interval gives credence to the reported figures. In addition, Skecklein (1961) and French Tupper, and Mueller (1965) had independent corroborations of the work hours faculty reported. Hence, 55 hours per week is a highly reliable number. It will be used below with full confidence.

What follows here is an intensive investigation designed to penetrate the umbra which has heretofore shaded the data needed for a full analysis.

A CASE

An extensive study (Trowbridge, 1971) and report (Trowbridge and Blackburn, 1972) provide the primary data for this analysis. Briefly, a 69% response from a 225 member faculty in six liberal arts departments in a distinctive graduate orientated university gave opinions, attitudes, and estimated work effort with respect to the Ph.D. dissertation process. Public records and university offices served as a source of needed demographic information. Nonrespondents were shown to be like respondents on all dependent institutional measures. Therefore productivity figures can be used for the entire population.

THE DATA

The principal data needed for the analyses are displayed in the tables below. The estimated percent of faculty work effort

spent on dissertation work is given in Table 1.³

[Insert Table 1 about here.]

3 Faculty also reported actual hours spent as a chairman and as a committee member. However, apparent unclarity in the question casts doubts on the validity of this self reported data. It was not clear if faculty were reporting the number of hours per year or the total amount in seeing a dissertation through to completion. Hence, these hourly data are not used here.

Table 2 gives Ph.D. output per faculty member over a three year period. It also shows the value he believes his department places for this dimension of the faculty work role.

[Insert Table 2 about here.]

The number of chairmanships and memberships he believes to be a reasonable load are given in Table 3. Here high agreement obtains from department to department, unlike the data in Tables 1 and 2.

[Insert Table 3 about here.]

To begin with, based on the percentage of work effort, hours worked per week, and Ph.D. output, a straight forward calculation gives a number of hours faculty spend on dissertation work. Suppose

Table 1.

Average Time Spent on Dissertation Work

Departments

Function	N	Humanities		Natural Sciences		Social Sciences		Totals
		1 (72)	2 (41)	1 (31)	2 (45)	1 (19)	2 (27)	(225)
Per cent of work effort		7.8	14.3	12.8	17.6	12.8	9.6	11.5

Table 2

Average Ph.D. Output* and Value** Placed on Guiding Dissertations

		Departments					
		Humanities		Natural Sciences		Social Sciences	
		1 (72)	2 (41)	1 (31)	2 (45)	1 (19)	2 (27)
N		Totals					
		(225)					
	Ph.D. output per faculty member per three years*	.81	.77	1.23	1.31	.80	1.04
	Value** faculty believe dept. holds with respect to guid- ing dissertations	3.1	3.4	3.8	3.7	3.7	3.2

*Three year sum used to offset rather great yearly fluctuations.
Number of faculty per department essentially constant over the
1967-1970 interval.

**5 = most important: 4 = very important: 3 = of average importance:
2 = of little importance: 1 = of least importance.

Table 3

Faculty Opinion on Proper Dissertation Workload

Departments

	Humanities		Natural Sciences		Social Sciences		Means
	N 1 (72)	2 (41)	1 (31)	2 (45)	1 (19)	2 (27)	(225)
Chairmanships at one time	2.8	3.4	3.1	2.2	3.1	2.9	2.9
Memberships at one time	4.3	5.6	5.3	4.2	5.9	4.8	4.8

the conservative faculty effort of 55 hours per week. (Studies at this university actually show 57 hours.) At 11.5% of effort, this is 6.3 hours per week. Suppose again a conservative estimate of 40 weeks per year, the 9-10 month academic year. (Actually faculty work the year around, especially with doctoral students.) The result is approximately 250 hours a year. (The three years for completion is cancelled by the supposition that he is chairing three at one time.)

This is no inconsequential number of hours. In addition, since equivalency of dissertation effort to other work roles -- especially to teaching are sought, it is imperative to demonstrate the reliability of the hours and of the work effort.

Several considerations lead to the conclusion that the professor's estimate of the percentage of his time is a dependable number. First of all, the studies cited earlier (Stecklein, 1961; French, Tupper, and Mueller, 1965) demonstrated that faculty are accurate estimators of the percentage of time they give to the different roles and functions they perform.

Secondly, and as additional corroboration, a social science department within the university (but not one of the two in this study) has successfully used a workload formula for their staff for over ten years. This formula partitions faculty activities into major areas and specific functions within. It uses a point system, with fractional units as small as 1/8. A full workload adds to 12 units. For example, regular teaching receives one unit per credit taught. (Laboratory work, seminars, special lectures, and the like

receive different degrees of credit.)

Data from the University's Office of Institutional Research shows this faculty to give slightly over 50% of its effort to regular course teaching. This self-reported faculty percentage agrees almost perfectly with other (independent) institutional data showing the faculty in this study to teach (on the average) 6.1 semester hours/term (Trowbridge, 1971: 54).

Thirdly, the reported doctoral committee chairmanships and memberships are in the right proportion, 3 to 5. (See Table 3.) That is, a typical committee is four members, the chairman and at least one, but not more than two others, from within the department. Hence, the number of memberships are more than chairmanships but less than twice as frequent, on the average.

Furthermore, on the workload formula just cited, $\frac{1}{2}$ unit is given to each chairmanship, $\frac{1}{8}$ unit to each doctoral committee membership. At this rate, $2 \frac{1}{8}$ ($3 \times \frac{1}{2} + 5 \times \frac{1}{8}$) of 12 units, or about 18% of a workload, falls within the self reported estimates. The 3 and 5 committee figures are a "could" -- that is, faculty responded to what they might increase their load to include. Thus the 18% is probably a fraction high. Again, the 11.5% seems a highly reliable figure, and not an overestimate.

Therefore, the figure of 11.5% seems an accurate one. So are the 250 hours. They will be used from here on.

Lastly, 11.5% is an interesting number. It is not so large that either faculty or administrators are attracted by its phosphorescent scintillations. Nor is it so small as to be invisible, to escape

detection. In fact, it is just this inbetween magnitude that has vital consequences when variations from it become appreciable. Human rods and cones are sensitive to wave lengths over a narrow band. Were the retina responsive to much larger or smaller wave lengths, the view of the world would indeed be very different - just structure but little substance (in the case of a world with x-ray eyes) or vision based on sound (in the case of longer wave length radiation). As were the inhabitants of Wells' Country of the Blind, so is 11.5% a number which greatly alters a professor's view of his work contribution when this number appreciably increases or decreases. It is to these consequences that we now turn.

SOME FINDINGS

Individual Factors

Several factors bear directly on individual accountability and cost. They are developed in some detail in Trowbridge and Blackburn (1972). Those having special significance to this inquiry are reported briefly.

First of all, no faculty member had chaired a completed dissertation until he had been on the staff for more than four years. Secondly, one-third of those who had been at the university more than four years had not chaired a completed Ph.D. dissertation. What this means, then, is that about 50% of the faculty produced all of the graduated Ph.D.'s. Both these groups, however, non-producers as well as producers, report they are engaged in working on dissertation committees with doctoral students.

Thirdly, great variations exists within this productive group. Some faculty are producing fifty times as many Ph.D.'s per unit of

time as are others. Individual output varies with percentage of workload given to this activity, but not in the same proportion. Those who are producing twice as many Ph.D.'s are giving less than twice as many hours, assuming equal total hours per week.

Fourthly, some characteristics of high faculty Ph.D. producers differ significantly from low producers. However, many often supposed features failed to distinguish the high from low producer. For example, the high producer did not spend more time in research or have more research funds. He did, however, have a larger number of grants. He was not judged by students to be a better teacher, but he did spend more time in social and informal contacts with graduate students. Interestingly, and most importantly, as will be shown below, the high producer turned down more requests to chair committees than did the low producer.

Institutional Factors

Tables 1 and 2 have shown the variation in percentage of time allocated to Ph.D. workload, the variation in output -- the highest being 60% greater than the lowest, and the difference between departments on the value accorded this activity.⁴ An inspection of the

⁴ Yet there is no significant difference between faculty in the departments with respect to what they believe they can handle, an interesting paradox.

data reveals that time, output, and normative value go together. Those departments which attribute a high value to graduating Ph.D.'s produce more graduates and spend more time at this activity. The implications of these and other findings are discussed next.

CONCLUSIONS AND IMPLICATIONS

Within the University

To begin with, a cost equivalent can be calculated for the first time. A faculty output of one Ph.D. per year is approximately one-third of a workload. From the data of these six departments, graduating a Ph.D. requires more effort than teaching one regular three hour course during a term. Since there is a price value on the credit hour, now there is a cost equivalency for Ph.D. output.

A word of caution, however. The measure has to be Ph.D. output, not effort. As was seen, non-producers are also giving effort, but are not graduating candidates. Universities can provide data on the number of students matriculated into doctoral programs and the average time lapse from B.A. to Ph.D. for those who successfully complete. They cannot, however, provide data on how many students are really "in process" especially at the dissertation stage. It is only the number who graduate that can serve both as a measure of an individual professor's productivity and of institutional productivity.⁵

⁵ Some difficulties arise in assessing the load of an untried new

faculty member. However, our organization has learned faculty can quite accurately predict their individual Ph.D. output for the next twelve months. Hence, planning can be conducted.

Within this restriction, Ph.D. output can just as readily be the photon of productivity as can the credit hour. Furthermore, since costs (salaries, support, etc.) are readily available, doctoral costs are now directly calculable.

A second major conclusion is the very simple fact that there are Ph.D. producers and non-Ph.D. producers on the faculty. The differences are enormous, even when confined to those who are producers, differences which presumably would be even more accentuated if the most productive accepted every student request to become a sponsor.

The implications of this extensive variation are large. If the educational unit places a high value on Ph.D. output, then administrators must recognize differential faculty workload. As matters now stand, most often the Ph.D. chairmanship role is considered an unrecognized overload, an "extra" above and beyond the regular full compliment of teaching, research, and service. It comprises 11.5% of a professor's effort, on the average and considerably more for the highest producers. To ignore this function is to be grossly unfair to the individual faculty member who produces Ph.D. students.

Thirdly, an important implication is that department chairmen and deans need to exercise better personnel management. The possibilities of attempting to distribute this work role more evenly over an

entire faculty and thereby severely limiting student option (and probably faculty desire, too) and of instituting differential faculty assignments should be carefully examined. The common practice of equalizing credit hours of teaching for all faculty (and time expected to be given to research and service) flaunts clearly demonstrated individual faculty differences.⁶

⁶ Not known, but equally important, is the highly questionable assumption of a perpetual evenness in a professor's interests and effectiveness. He is given the same proportion of activities year after year. That he has no cycle in his career, no barren or fertile periods, say, with respect to research, flies in the face of almost all evidence of what happens psychologically and physiologically to a man from age 30 to 70. See Blackburn (1972).

If the number of staff is based on student credit hours, or some institution wide student-faculty ratio, great injustices are practiced unless additional faculty per student are provided. Certainly an administrator wishing to increase his Ph.D. output would selectively take on a faculty of high producers. Equally certain must he recognize the work effort required to attain the goals set by society. A practice which recognizes individual faculty differences seems much more likely to achieve success than one which requires identical apportionments of faculty effort. In addition, the latter severely penalizes student options. Obviously students are sensitive to faculty

differences, for they turn to high producers. This is another reason it would seem unwise to have administration control chairmanships by allocation.

Finally, it is patently unfair to compare teaching loads at institutions and/or programs within an institution designated to be Ph.D. producers with those that are not, or are only modestly in the business. Workload equivalency necessitates inequality in teaching the typical course-credit-hours.

External Relations

While not nearly at the cost of training M.D.'s, educating Ph.D.'s does require a high fraction of faculty work effort. Just as a hospital has all M.D.'s on its staff for supervising interns, so does a university require all doctoral committee members to have Ph.D.'s. Hence, at the studied university, and ones comparable to it, well over 90% of their faculty have Ph.D.'s. The percentage contrasts with a national average for four year colleges and universities of 53% (Joughin, 1969) and of less than 10% Ph.D.'s for junior and community colleges (Huther, 1972).

Thus a highly graduate orientated university inevitably will have a higher proportion of its faculty at the upper ranks, and hence at higher salaries. More money will go for faculty salaries at these institutions than at others with fewer or no doctoral programs.⁷

⁷ The argument is not advanced that professors at doctoral pro-

ducing universities deserve more money because they are at doctoral producing universities. In any economic analysis of income vs. investment, faculty at doctoral universities fair the worst of all. This is clearly seen when it can be shown that faculty at community colleges in this same state have an average salary of 93% of the university in question. The community college faculty's masters degree took 3-7 years less to earn. Hence cost of education is greatly less and period for income greatly more. Community college faculty earn more per investment than teachers in schools on either side of them. This is not to argue (at least here) that university salaries should be higher. All it says is that faculty at doctoral universities did not choose to work there in order to get rich. They selected this particular career for non-monetary reasons. Also, it is not fair to imply that those teaching at community colleges did so to get rich. They probably had other reasons, too. In fact, it really is incomprehensible to even entertain the notion of anyone, ever, anywhere, selecting an academic career, because he or she wanted to become rich.

Again it is essential to keep firmly in mind that better and worse are in no way an issue. Society's needs are for different kinds of human capital, for different kinds of expertise. Some simply are more expensive to produce than are others.

Finally, the analysis has uncovered no evidence that faculty fall short with respect to accountability. They are hard at work,

a number of hours exceeded by no other occupation (Gerstl, 1959; de Grazia, 1962). Like other human beings, they dislike being stereotyped, especially falsely. Faculty, too, believe they are unique, distinctive. They would like to have their special attributes duly recognized, not out-of-proportion to their worth, just fairly.

Newton discovered many basic properties of light, including several with respect to color. To test hypotheses he passed a beam of light through a very narrow slit in a window shade into a darkened room, then through prisms. He made precise measurements of length to width of the images formed on special screens. Similarly, we have learned about faculty performance by scrutinizing its details, by breaking it into component parts.

But as was said above -- a faculty member's life is his work. To dissect his role is to artificially partition what is indivisible. In this way, faculty view themselves more from Goethe's perspective than from Newton's. Temporizing countryman's Goethe's attacks on Newton and attributing them to the dominance of the poetical over the scientific genius of the author, Helmholtz nonetheless captures many a faculty member's attitude toward those who translate his humanness to numbers. As he writes:

Just as a genuine work of art cannot bear retouching by a strange hand, so he (Goethe) would have us believe Nature resists the interference of the experimenter who tortures her and disturbs her;... (Goethe) often sneers at spectra, tortured through a number of narrow slits and glasses,...

Mistreating what is natural, light, or a professor, results in a

false picture of what is real. For Goethe says that

(Nature), in revenge, misleads the
impertinent kill-joy by (giving) a
distorted image of herself (1891: 40).

We, too, have distorted a true image of faculty in our
analysis. Our object, like Newton's, was to learn, not fabricate
artificial components.

But Newton's aim was also to understand the whole. His
method for achieving comprehension, however, called for analysis
first. In the questions Newton raises at the close of his Opticks,
he writes:

As in Mathematics, so in Natural Philosophy
the Investigation of different things by the
Method of Analysis, ought ever to precede
the Method of Composition. This Analysis
consists in making Experiments and Observations,
and in drawing general Conclusions from them
by Induction,... (1704: 404).

We know that a professor and his work are one. Work gives him his
manliness, his dignity. His colleagues, students, and faculty inter-
act and support his means and his ends. No other occupation permits
the latitude and creative freedom he enjoys to perform his job.
He is not ungrateful. He lives close to his work, can wear a red
plaid vest after forty, ride a bicycle to his office; he can cheer
at a hockey game, drink his scotch with a twist of lemon, have his
opinion counted and sought.

The Academic Man is always at work -- and never at work. A
near Utopian state.

He is one man, a whole man.

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